Environment, Safety and Health Bulletin

Potentially Defective Battery Charger

DOE/EH-0697 2005-15 October 2005

***Special Operations Reports** are issued to initiate management actions in response to events whose subject matter represents significant Departmental safety concerns.*

***Environment, Safety and Health Alerts** are issued to initiate immediate action on potentially significant safety issues.*

***Environment, Safety and Health Bulletins** are issued to share information and recommend actions on potential safety issues.*

***Safety Advisories** are issued to provide information to the DOE Complex on potentially significant safety or health issues.*

PURPOSE

This Safety Bulletin is being issued to alert readers to potential defects in Solar Truck Pac® model ES1224 battery chargers manufactured by Clore Automotive. Specifically, the Office of River Protection at Hanford reported that one of these chargers exploded (Figure 1) following two attempts to jump-start a crane.

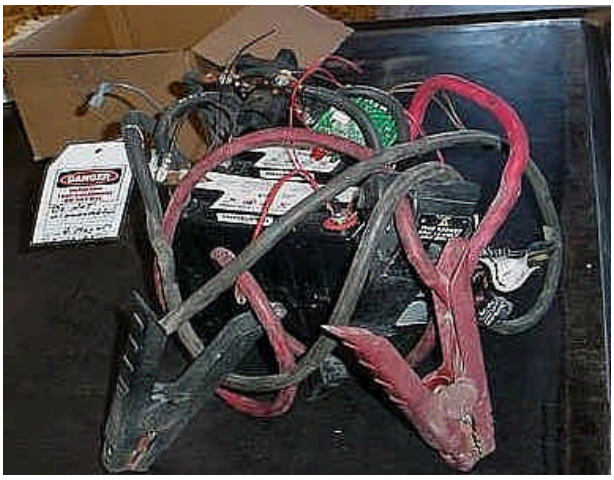

Figure 1. The damaged battery charger after the explosion

BACKGROUND

On August 30, 2005, at the River Protection Waste Treatment Plant construction project, a maintenance mechanic connected the battery charger unit to a crane and attempted to jump-start it. He turned the voltage selector switch from 12v to 24v and tried to start it again, but was unsuccessful. He then turned the switch from 24v to OFF and the charger exploded, propelling pieces of the plastic case as far as 25 feet. No one was injured, but three workers, including the maintenance mechanic, reported to the project medical facility with muffled hearing. [ORPS Report RP--BNRP-RPPWTP-2005-0021]

The mechanic and his superintendent examined the remains of the battery charging unit and found that the rubber caps that covered the battery cells had not been properly seated on the cells, and two of the caps were visibly deformed (see Figure 2 below). Also, the case itself did not appear to have been adequately ventilated, and the switch contacts were exposed. Investigators believe that built-up hydrogen gas inside the case was ignited by a spark generated by the exposed contacts.

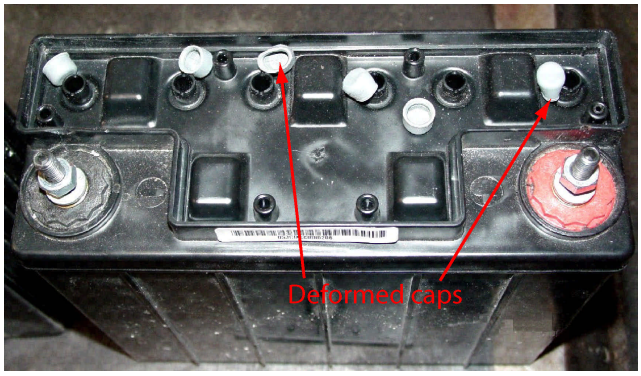

Figure 2. The uncapped battery charger cells

Bechtel, the Waste Treatment Plant construction subcontractor, contacted the manufacturer to obtain more information about this model of battery charger. The manufacturer acknowledged that the switch design has been changed but did not provide additional details about the defect or information about other units that may have exploded. Figures 3 and 4 below illustrate the old and new switch designs.

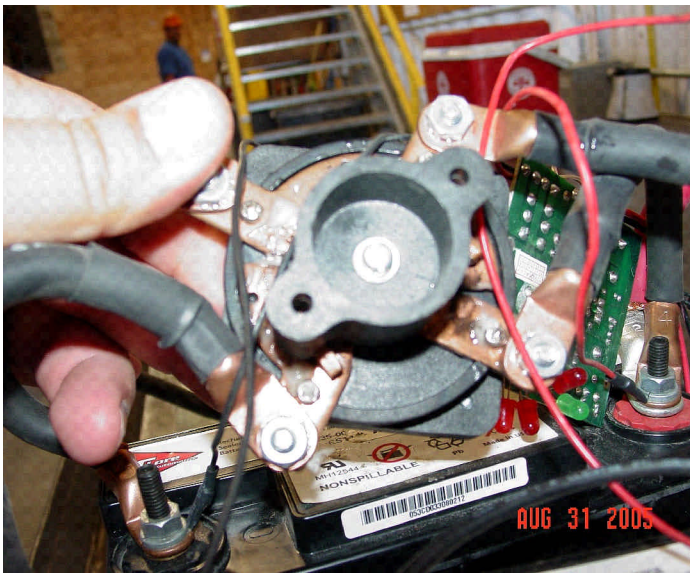

Figure 3. Old switch design

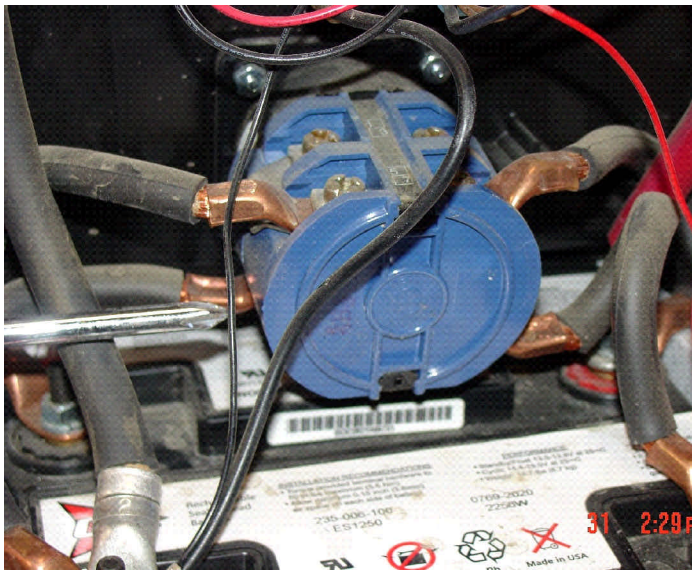

Figure 4. New switch design

IMPLICATIONS

An exploding battery charger can cause personnel injury from flying pieces or burns from contact with the sulfuric acid inside the cells.

Normal operation and charging of lead-acid batteries produces hydrogen, which is continuously vented from the battery cells. Any condition, such as inadequate ventilation or confined spaces, which allows the hydrogen to accumulate presents a potential explosive hazard. For this reason, ignition sources including sparks, smoking materials, and flames must be kept away from batteries.

ACTIONS

Because this is preliminary information and we have not received specific guidance from the manufacturer, the Office of Environment, Safety and Health recommends that sites examine their inventory of battery charging equipment, removing any Solar Truck Pac model ES1224 units from service to verify the switch design and properly capped cells. If a defective unit is found (i.e., caps not properly seated or old switch design), contact the distributor from which the unit was purchased and report this finding in the Occurrence Reporting and Processing System (ORPS).

Questions concerning this Environment, Safety and Health Safety Bulletin should be directed to Tom Williams at (301) 903-4859 or e-mail Thomas.E.Williams@eh.doe.gov.

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